

CLAIMS

1. An electrically conductive thermoplastic elastomer composite comprising an elastomer matrix and metal-containing particles as an electrically conductive filler, **characterized** in that the electrically conductive particles are at least partly coated with a self-assembled monomolecular layer whose molecules correspond to the general structure 1:



- 10 where X is a neutral end group capable of forming a stable complex with the metal surface.

2. A thermoplastic elastomer composite as claimed in claim 1, **characterized** in that X is mercaptan (SH), 4-pyridine or phosphine.

3. A thermoplastic elastomer composite as claimed in claim 1 or 2, 15 **characterized** in that n in the general structure 1 is between 9 and 19.

4. A thermoplastic elastomer composite as claimed in any one of claims 1, 2 or 3, **characterized** in that neutral molecular wires are arranged in the self-assembled monomolecular layer.

5. A thermoplastic elastomer composite as claimed in claim 4, 20 **characterized** in that the length of said molecular wires is between 7 and 21 Å.

6. A thermoplastic elastomer composite as claimed in claim 4, **characterized** in that said molecular wires are quaterthiophene (QT) or diphenylhexatriene (DPHT) molecules.

25 7. A thermoplastic elastomer composite as claimed in claim 1, 2 or 3, **characterized** in that an electrically conductive polymer is arranged in the self-assembled monomolecular layer.

8. A thermoplastic elastomer composite as claimed in claim 7, **characterized** in that the electrically conductive polymer is polyaniline 30 (PANI), polypyrrol and/or polythiophene.

9. A thermoplastic elastomer composite as claimed in any one of the preceding claims, **characterized** in that the elastomer matrix comprises at least two polymer phases.

10. A thermoplastic elastomer composite as claimed in any one of 35 the preceding claims, **characterized** in that it comprises a styrene-ethene-butene-styrene copolymer (SEBS).